

Claims:

1. A method of distributing rights-managed media data items to users, wherein each media data item has associated rights information, including a time-limited availability attribute, the method comprising, for each media data item:
in a seeding phase:
storing the media data item;
receiving requests for the media data item from a plurality of users;
determining the availability of the requested media data item based on the associated rights information;
transmitting the requested media data item to the plurality of users;
storing information identifying the media data item, the associated rights information for the media data item and a list of users who have received the media data item;
in a peer-to-peer phase:
receiving requests for the media data item from at least one further user;
compiling a list of sources of the media data item in a peer-to-peer network based on the list of users who have received the media data item;
determining the availability of the requested media data item based on the associated rights-information;
transmitting the list of sources to the at least one further user to enable the user to obtain the requested media data item via the peer-to-peer network;
storing information identifying the requested media data item, the at least one further user and the rights-information of the requested media data item.
2. A method according to Claim 1 wherein the seeding phase comprises seeding the media data items from a central content server to seeding servers connected to the peer-to-peer network at a plurality of points.
3. A method according to Claim 1 or 2 wherein the seeding phase comprises seeding the media data items to users in the peer-to-peer network.
4. A method according to any of preceding claim further comprising deleting the media data item from the persistent store in the peer-to-peer phase.

5. A method according to any preceding claim wherein the step of storing information comprises storing information in a tracker device associated with the requesting user.
6. A method according to any preceding claim wherein the seeding phase comprises supplying the requested media data item to a predetermined number of users.
7. A method according to any preceding claim wherein the peer-to-peer phase further comprises the step of supplying the requested data directly to the user if the data is not readily available via the peer-to-peer network.
8. A method according to any preceding claim wherein the step of determining the availability of the requested media data item includes determining the availability based on the time-limited availability attribute for the media data item.
9. A method according to any preceding claim wherein the time-limited availability attribute is determined based on the time and/or the date of the release or broadcast of the media data item.
10. A method according to any preceding claim wherein the time-limited availability attribute comprise an attribute defining the number of times a user can access playback or copy the media data item.
11. A method according to any preceding claim wherein the list of sources of the media data item includes routing information for each source to enable the user to obtain the media data item from each source.
12. A method according to any preceding claim wherein the list of sources of the media data item is prioritised based on at least one of:
the estimated topographical distance of the source from the user in the network,
preferably estimated based on the respective Internet Protocol addresses of the source

and the user, preferably taking account of bandwidth restrictions and/or reliability of availability of each source;

the network service provider of the user and the source;

the type and/or speed of connection of the source to the peer-to-peer network.

13. A method according to any preceding claim wherein the media data item comprises a plurality of chunks of media data.

14. A method according to Claim 13 wherein, in the seeding phase, the step of transmitting the media data item comprises transmitting each chunk of the media data item and wherein, in the peer-to-peer phase, compiling a list of sources of the media data item comprises compiling a list of sources of each chunk of the media data item.

15. A method according to Claim 13 or 14 wherein, for each chunk of media data, an associated hash value is calculated.

16. A method according to any of Claims 13 to 15 further comprising calculating a hash value for each chunk of media data and writing the hash values into a hash file for the media data item.

17. A method according to Claim 16 further comprising signing the hash file using a digital signature.

18. A method according to Claim 16 or 17 further comprising transmitting the hash file to the user or transmitting data to enable the user.

19. A method according to any preceding claim wherein the media data item comprises audio and/or video data.

20. A method according to any preceding claim wherein the user comprises a user device comprising at least one of:
a computer;
a personal digital assistant (PDA);

a mobile telephone handset;
a Wi-Fi device;
a set-top box;
a 3G device.

21. A method according to any preceding claim further comprising determining the type of the user device from which the request for a media data item is received.

22. A method according to Claim 21 further comprising selecting a format for the media data item based on the type of the user device determined.

23. A method according to any of Claims 1 to 20 further comprising receiving a user input to specify the type of user device and/or the requested download format.

24. A method according to any preceding claim wherein the step of determining the availability of the requested media item comprises determining the availability based on at least one of:

an estimate of the geographical location of the requesting user;
the Internet Protocol (IP) address of the requesting user;
an identifier of the requesting user;
attributes of the requesting user;
the type of the media data.

25. A method according to any preceding claim wherein the information stored identifying the user includes:

the type of user device;
the type and/or speed of the connection from the user to the peer-to-peer network;
the format of the media data item transmitted to the user.

26. A method according to any preceding claim further comprising receiving and storing availability information from users in the peer-to-peer network, wherein the availability information indicates the availability of users to peer to other users in the network.

27. A method according to any preceding claim further comprising receiving additional data for the media data items stored by users in the network.
28. A method according to Claim 27 wherein the additional data includes at least one of:
an identifier of each media data item stored;
the time and/or date of download of the media data item by the user;
hash values for each chunk comprising the media data item;
the time and/or date of access by the user to the media data item.
29. A method according to any of Claims 24 to 28 wherein the user availability information and/or the additional data for the media data items is stored on a tracker device associated with the user.
30. A method according to Claim 29 wherein one tracker device receives and stores data from a plurality of users in a section of the peer-to-peer network.
31. A method according to Claim 29 or 30 wherein a plurality of interconnected tracker devices is used to receive and store data from the users in the peer-to-peer network.
32. A method according to any of Claims 29 to 31 wherein the or each tracker device maintains a source list for the media data items.
33. A method according to any preceding claim further comprising generating reporting data from the information received from the users.
34. A method according to Claim 33 wherein the reporting data comprises at least one of:
the number of download requests made by the user;
the proportion of time that the user is available for peering to other users;
the type of the user device of the user;

the type of the connection from the user to the peer-to-peer network;
the number of requests received for the download of each media data item;
the number of successful downloads performed for each media data item.

35. A method according to any preceding claim further comprising verifying the authenticity of media data items transmitted within the peer-to-peer network.

36. A method according to any preceding claim further comprising verifying the authenticity of media data items stored on user devices.

37. A method according to any preceding claim further comprising verifying the authenticity of media data items accessed by user devices.

38. A method according to any preceding claim wherein the media data item comprises a digitally signed chunk of data embedded in the header of the media data time.

39. A method according to Claim 38 wherein the authenticity of the media data item is verified based on the digitally signed chunk of data embedded in the header.

40. A method of obtaining a rights-managed media data item wherein the media data item has associated rights information, including a time-limited availability attribute, the method comprising:

in a peer-to-peer network, comprising a plurality of user devices and a central system,
requesting the media data item from the central system;
receiving details of at least one source of the requested media data item, wherein the at least one source comprises a source in the central system and/or a list of sources in the peer-to-peer network;
if the details of the at least one source comprises a list of sources in the peer-to-peer network, establishing a peer-to-peer connection to a source of the requested media data item selected from the list of sources;
if the source is in the central system, establishing a connection to the central system;

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receiving the requested media data item via the peer-to-peer connection or the connection to the central system.

41. A method according to Claim 40 wherein the central system comprises a plurality of interconnected seeding servers and wherein establishing a connection to the central system comprises establishing a connection to a seeding server.

42. A method according to Claim 41 wherein the central system further comprises a central server, preferably wherein the central server is connected to the distributed network of seeding servers.

43. A method according to any of Claims 40 to 42 wherein the media data item comprises a plurality of chunks of media data.

44. A method according to any of Claims 40 to 43 further comprising verifying the authenticity of the media data item.

45. A method according to Claim 44 wherein verifying the authenticity of the media data item comprises verifying at least one digital signature associated with the media data item.

46. A method according to any of Claims 40 to 45 wherein the media data item comprises a plurality of chunks of media data.

47. A method according to Claim 46 wherein each chunk of media data has an associated hash value.

48. A method according to Claim 46 or 47 wherein each media data item further comprises a hash file, preferably wherein the hash file includes the hash values for each of the chunks of media data making up the media data item.

49. A method according Claim 48 wherein the hash file has an associated digital signature.

50. A method according to Claim 49 wherein verifying the authenticity of the media data item comprises:
verifying the digital signature associated with the hash file; and
verifying the hash values of each of the chunks of media data against the hash values stored in the hash file.

51. A method according to any of Claims 40 to 50 further comprising providing an interface to enable a user to access the received media data item.

52. A method according to any of Claims 40 to 51 wherein the list of sources received is prioritised by the central system.

53. A method according to any of Claims 40 to 52 wherein the details of at least one source are received from a tracker device in the central system.

54. A method according to any of Claims 40 to 53 wherein the source of the media data item is selected by the user device of the requesting user.

55. A method according to any of Claims 40 to 54 wherein, prior to enabling the user to access the received media data item, the method comprises verifying the authenticity of the media data item.

56. A method according to any of Claims 44 to 55 further comprising preventing download of the media data item or access to the media data item by the user if the authenticity of the media data item is not correctly verified.

57. A method of deriving digital rights management data for media data comprising:
receiving media data having associated rights information metadata;
extracting the metadata from the media data;
parsing the metadata to derive digital rights management data for the media data, including determining a time-limited availability attribute for the media data;

providing access to the digital rights management data for a media data distribution system.

58. A method according to Claim 57 further comprising managing the distribution and availability of the media data in the peer-to-peer network based on the digital rights management data derived.

59. A method according to Claim 57 or 58 wherein the time-limited availability attribute is derived based on the time and/or date of the first release or broadcast of the data, or based on fixed time limits specified by the content provider.

60. A method according to any of Claims 57 to 59 wherein the metadata includes at least one of:

the date and/or time of first broadcast of the media data;
the type of the media data;
the geographical region of the broadcast of the media data.

61. A method according to any of Claims 57 to 60 wherein deriving the digital rights management data includes deriving a geographically-limited availability attribute for the media data.

62. A method according to any of Claims 58 to 61 wherein managing the distribution and availability of the media data includes determining or receiving metadata for a user requesting the media data and determining the availability of the media data to the user based on the metadata for the user and the digital rights management data determined for the media data.

63. A method according to Claim 62 wherein the metadata for the user includes a geographical location attribute for the user.

64. A method according to Claim 63 wherein the geographical location attribute is determined based on the Internet Protocol (IP) address of the user.

65. A method of distributing validated data in a network comprising:
dividing the data into a plurality of data chunks;
deriving a hash value for each data chunk;
writing the hash values of each data chunk into a hash file for the data;
digitally signing the hash file;
providing access to the data chunks to at least one user in the network;
distributing the signed hash file to the at least one user in the network.
66. A method of retrieving and verifying data obtained in a network, wherein the data is divided into chunks of data, the method comprising:
obtaining a hash file for the data having an associated digital signature, wherein the hash file contains a hash value for each of the chunks of data;
obtaining chunks of data, each chunk of data having an associated hash value;
verifying the authenticity of the hash file using the associated digital signature;
verifying the authenticity of each of the chunks of data using the hash values in the hash file.
67. A method according to Claim 66 wherein obtaining chunks of data comprises obtaining chunks of data from a plurality of data sources.
68. A method according to Claim 66 or 67 wherein the step of verifying the authenticity of each of the chunks of data is performed on receipt of the chunks of data by the user.
69. A method according to any of Claims 66 to 68 wherein the step of verifying the authenticity of each of the chunks of data is performed on attempted access to the chunks of data by the user.
70. A method according to any of Claims 65 to 69 wherein a hash value is determined for the hash file itself before the hash file is signed.
71. A method according to any of Claims 65 to 70 wherein the network is a peer-to-peer network.

72. A method according to Claim 71 wherein chunks of data are obtained from one or more peers in the network.

73. A method according to any of Claims 66 to 72 wherein the hash file is obtained from a central system.

74. A method according to any of Claims 65 to 73 wherein the data comprises media data, preferably digital-rights managed media data.

75. A method according to any of Claims 65 to 74 wherein the hash value comprises a hash value of at least 128bits.

76. A method of distributing rights-managed media data items in a peer-to-peer network comprising:

receiving a request for a media data item at a central system from a user in the peer-to-peer network;

deriving a list of sources of the media data item in the peer-to-peer network;

determining the relative priorities of the sources of the media data item in the list based on the network service provider of the requester and the network service provider of the or each source;

supplying the list of sources of the media data item and the routing information to the requesting user.

77. A method according to Claim 76 further comprising deriving routing information for each of the sources of the media data item and determining the relative priorities based on the routing information derived.

78. A method according to Claim 76 or 77 wherein the network service provider of the user or the source is determined based on the IP address of the user or the source.

79. A method according to any of Claims 76 or 78 wherein the relative priorities of the sources of the media data item in the list are further determined based on the relative geographic distribution of the requesting user and the sources of the media data.
80. A method of obtaining a digital rights managed media data item over a peer-to-peer network comprising:
requesting the media data item from a central system;
receiving source information for the media data item from the central system, wherein the source information identifies users within the peer-to-peer network from whom the media data item may be obtained via a peering connection;
receiving user input to specify a download time for obtaining the media data item;
at the specified download time, establishing a peering connection with a user based on the received source information and downloading at least a portion of the media data item from the user.
81. A method according to any preceding claim wherein the central system specifies time at which the user can obtain and access the data.
82. Apparatus for performing a method according to any of Claims 1 to 81.
83. A computer program or computer program product comprising instructions for carrying out a method according to any of Claims 1 to 81.
84. A method of distributing rights-managed media data in a peer-to-peer network generally as described herein.
85. Apparatus for distributing rights-managed media data in a peer-to-peer network generally as described herein or as illustrated in any of Figs 1 to 4.
86. A method of distributing rights-managed media data items to a plurality of user media devices, wherein each media data item has associated digital rights information, the method comprising, for each media data item:

storing the media data item, associated with digital rights information, as a plurality of portions, each portion having a hash value;
receiving a request for the media data item from at least a first user media device;
determining the availability of the requested media data item based on the associated rights information;
supplying at least a portion of the requested media data item from a server to said at least a first user media device;
storing information identifying the portions of the media data item, the associated rights information for the media data item, and a list of user media devices, if any, which have already received each portion of the media data item;
receiving a request for the media data item from at least one further user media device;
providing a list of sources of each portion of the media data item and corresponding hash values of each portion based on the list of user media devices which have received the media data item;
transmitting the list of sources to the at least one further user media device for the user media device to obtain portions of the requested media data item;
updating the information identifying the portions of the requested media data item and the user devices which have received each portion, preferably in response to feedback from a user media device that a given portion has been received.

87. A download client for receiving rights-managed media data, the download client comprising:

a user interface for receiving a user request for a media data item, preferably including a programme display for displaying a list of available items and receiving user selection information;
a download manager for contacting a first server following a user request to obtain a list of portions of the media data item, a list of possible sources for each portion and a hash value or signature for each portion;
a peer-to-peer client for communicating with at least one source for each portion to receive the media data for each portion;
a content authentication module for verifying received media data portions with corresponding hash values or signatures;

a file manager for making the complete media data item available for rights-managed playback following verification of all portions.